CHAPTER VIII

(1) Maintenance—Protection

General

1. As soon as the young tree is planted, it requires to be protected against various dangers. A tree may be destroyed by ordinary traffic or by animal grazing or passing along the road; and the method of protection must be such that passengers will avoid the tree, and that animals, especially goats will be unable to reach it, while at the same time traffic must not be obstructed. A large proportion of the failures in road-side planting are due to the inadequate fences made for the protection of the trees planted. It is a common sight to see long avenues of trees planted and watered at very great expense, but protected only by thorn branches stuck into the ground. Trees fenced in this manner are always eaten down. The money spent on them might as well be thrown away. With all forms of guards it is essential that the Mali should be able to reach the soil round the trees and to break up the surface with his kurpi.

Different forms of guards

2. No method of protection can be recommended for universal adoption; the different methods in use are discussed below and the decision which of them shall be adopted must depend on the circumstances of the locality:—

(a) *Iron guards (Fig. 1 and 7, Plate III).*—These may be made of standards of iron hooped together and enclosed with wire netting. They must be strong enough, that is, the standards must be sunk sufficiently deep, to withstand an animal knocking against them; and they must be high enough to prevent animals reaching over the top. If these conditions are fulfilled, they give perfect protection, but at an expense that appears to be prohibitive in most places. The attempts to produce cheap iron guards have usually been failures; either they have been so weak that they have been destroyed by animals or even passers-by, or they have been so narrow or so short that goats could get at the trees through or over them.

They are suitable in and near towns, where traffic is very heavy, and unsightly forms of guards are open to objection. In such places the best pattern is that made of iron hoop lattice, in two pieces, each framed on iron bars, curved and tapered towards the top. When set up, the two pieces are fastened together with wire. This pattern of guard stands firmly, and has the merit that it can be easily taken off a tree that has out-grown the need of it and carried off to another place; whereas tree guards forming a complete circle are very difficult to remove from trees, and are so bulky as to be inconvenient in transport.

(b) *Wooden guards (Fig. 2 Plate III)*.—Having usually been failures, except to a limited extent in and near towns. The remarks made as to iron guards apply here also, while in addition they are often destroyed by white ants, or the materials are used by the people for fuel.

(c) *Open work brick guards.*—May be used where bricks are available, but they are not very satisfactory. They keep too much light off the plant, if small plants are used, and they gradually disappear as people carry away single bricks for seats or for use in other ways. If they are made tall enough the loss of light is very serious, while if they are low, goats can reach over the top, and thorns must be fastened round them to prevent this. If such guards are used, the top course of bricks should be set in good mortar.

(d) Live hedges.—Probably the cheapest protection is a hedge of cactus, not prickly pear, but babul, agave and other thorny plants may also be used. They should be planted at least a year before the tree is to be planted so as to give the protection at the time when it is required. They may be made effective, but it is difficult to make them grow evenly, and a very small space is sufficient to admit a goat inside the hedge. They should not be allowed too near the tree; four feet is the minimum distance that should be allowed, as otherwise they will compete with the young tree for the moisture in the soil. They must be regularly pruned twice a year in order to prevent their becoming too thick and so stopping light and air from reaching

the tree. Where live hedges are adopted the supervision over them must be constant and vigilant.

(*e*) *Thorns.*—A circle of thorny branches fixed firmly in the ground round each tree may be very effective, if care is taken, and economical if thorns are readily to be had in the neighbourhood. They must be firmly fixed in the ground and pegged down if necessary, and the hedge must be made thick and strong. The thorns will have to be renewed and the hedge repaired at least once a year, and careful supervision is required to insure that the hedge is always effective and especially to see that the Mali fills up any gaps that he may have made in order to get at the ground round the young trees. To prevent this a light bamboo step ladder should be used (Fig. 3 Plate III). These hedges have the disadvantage that they are liable to be broken down and stolen for firewood. Dry thorn loppings piled up round the trees planted make a temporary protection, which is, however, apt to get out of repair and always liable to be broken down, or stolen by passers-by to light their fires. The thorn loppings require to be constantly renewed. By the addition of a mud wall and ditch, the wall being roughly built from the soil thrown out of the ditch, the thorn loppings may be made a real defence. The inside diameter of the circle enclosed by the wall should be at least six feet, the ditch being of course outside the wall ; the ditch to be useful should be two feet deep. But such a protection takes up too much room for use anywhere except on country road.

(*f*) *Mud walls.*—(Fig. 4 Plate III)—This is the commonest form of protection and is effective if the wall is kept in proper repair and enough thorns stuck into the top to prevent animals from reaching over it. The cost of this protection is rather high, and where it is adopted supervision is required to see that the walls are not allowed to fall into disrepair, and that surplus water does not collect inside the guard in wet weather.

(*g*) *Trenches.*—The ordinary trench, dug with steep sides close to the young tree, is most unsuitable. The tree is left standing on a narrow cylinder of earth which soon washes down into the trench and exposes the roots. Where space is available a trench and bank combined

make perhaps the most effective guard of all, provided it is properly laid out. The minimum dimensions of such a guard are given below, and where space for these dimensions is not available, some other form of guard should be substituted.

As has been stated the hole in which the young tree is planted should be at least 3 feet deep and 4 feet in diameter at the top and 3 feet at the bottom. Taking the middle of this hole as centre, draw two circles round it, one of 4 feet radius and the other of 6 feet outside the hole; there will thus be two circles, one of 8 feet and the other of 12 feet diameter. Dig out the earth from the space between the circumference of the outer and inner circles, and throw it up on the space between the circumference of the inner circles and the edge of the plant hole, so as to make a trench (Fig. 5 Plate III), 2½ feet deep, 2 feet broad at the top and 1 foot broad at the bottom, with a sloping mud bank inside it 2 feet broad and 2½ feet high Inside the mud wall will be the plant hole. The ditch will thus be at least 3 feet distant from the roots of the young tree. Some babul thorns should be stuck into the top of the bank while the earth is wet.

The bank and ditch should be made during the rains after the tree has been planted. Little repair will be required and as soon as the tree is old enough to dispense with it, the bank can easily be thrown back again into the ditch, and the ground neatly levelled. Before filling in the ditch it will be as well to take the opportunity of "mulching" the tree roots by half filling the ditch with dead leaves, and saturating them with water. This will tend to draw out the roots and give the tree increased power of resisting drought.

(*h*) Wire fencing is durable and not very costly. The wires must be close together for some height from the ground. The standards usually supplied are too light and are damaged by cattle.

(*i*) Wattle fencing (Fig. 6 Plate III), used where branches of trees, bamboos, or other suitable material is available, is made by interlacing long flexible branches, basket fashion, round stout uprights embedded in the ground. Such a fence costs little when the material for making it is available on the spot. It has, however, all the disadvantages of other wooden fences; it gets out of

repair very quickly and has to be renewed, the material is liable to be stolen for firewood and the fence broken down in consequence. Such guards are, however, used largely and successfully in Bengal.

(*j*) Basket guards of somewhat the same shape have been tried in Bombay and may be economical where labour and materials are available. They have the same disadvantages of other wooden guards and in addition are generally too weak and too small in diameter to form an efficient protection.

CHAPTER IX

(2) MAINTENANCE—WATERING

Need of irrigation

1. In ordinary cases trees require irrigation for the first three years after planting out, but no absolute rule can be laid down, as much depends on the soil and climate and also on the kind of tree. The need of each locality must be determined by experience. The amount of water required varies with the season ; in the rains watering is necessary only during periods of fine weather, but then it is required at very short intervals ; in the cold weather the water lasts much longer, while from March to June constant attention is needed to save the trees from injury.

Water-supply

2. At the time of deciding on the sections of road to be planted, the question of water-supply should be considered, if there is a canal channel cutting the road and giving a constant supply of water, arrangements can usually be made for drawing most of the supply from it. If there is no canal, or only one with an intermittent supply, existing wells can be used, and if there are none, wells must be sunk at convenient distances. Where water has to be carried from a long distance, the expense of irrigation is greatly increased, and there is also greater probability of neglect on the part of the malis.